

US-PAT-NO: 5532705

DOCUMENT-IDENTIFIER: US 5532705 A

**TITLE: Wrist-mounted-type antenna device and
apparatus having
the antenna device**

----- KWIC -----

Brief Summary Text - BSTX (18):

In order to improve the gain of the antenna assembly, a reflective member may be installed in the main body behind the antenna device. When a displaying unit is located on the front surface of the main body, the antenna assembly can be arranged to the sides of the displaying unit. Alternatively, the antenna assembly may be formed by a transparent thin conductive film over the displaying unit. If the main body has an outer frame, the antenna assembly may be disposed on the outer frame so that the slot extends along a peripheral surface of the outer frame.

Detailed Description Text - DETX (17):

However the present antenna assembly 13 is a magnetic field affecting antenna in addition to being a slot antenna. Therefore, if an earth plate (a grounded plate) 10 is provided near the center of the antenna 13 parallel to the antenna, a property of radiation of the antenna 13 improves as shown in FIG. 4B by solid line 19. Additionally the gain of antenna 13 increases. In the present wrist-mounted-type portable radio apparatus 1, because the circuit board 5 and the reflective plate 6 are arranged at the rear surface side of the antenna assembly 13, and especially at the rear surface side of the electrically conductive plates 4a and 4b, circuit board 5 and reflective plate 6 function as a ground plate 10. Accordingly, the radiation wave from the antenna 13 to the front surface is not blocked by the reflective plate 6 and the circuit board 5. Because the ground plate 10 comprised of the circuit board 5 and the reflective plate 6 has an image effect and acts as a reflector, a gain of directivity of the antenna assembly 13 becomes about twice that of conventional slot antennas. In addition, when the

wrist-mounted-type portable radio apparatus is mounted on the user's wrist, the wrist is located under the circuit board 5 and the reflective plate 6. Therefore, the user's wrist can be used as a part of the ground plate 10, namely, by the present wrist-mounted-type portable radio apparatus, a magnetic field around the human body can be used actively.

Detailed Description Text - DETX (35):

In the above wrist-mounted-type portable radio apparatus 30, the electrically conductive plates 4a and 4b are arranged on the front surface side 1A of the main body 1a. The number plate 24 is made of a non-metallic material so that the radiation wave from the electrically conductive plates 4a and 4b is not shielded thereby. The electrically conductive plates 4a and 4b are disposed at the front surface side (the number plate side) of the main body 1a with respect to the circuit board 5 disposed in the main body 1a. According to the arrangement of the present portable radio apparatus 30, the power feeding point to the antenna assembly 13, which has the maximum radiation energy, is

the center of the longer side of the assembly 13, which is located on the electrically conductive plates 4a and 4b. Since the radiation from the electrically conductive plates is not shielded, the energy of the radiation wave can be maintained at a high level. The circuit board 5 and the other parts arranged on the rear side of the antenna assembly 13 act as a reflector so that the directivity of the present antenna assembly is upgraded. The circuit board 5 and the other parts also can shield the affect of the human body, so that the impedance matching between the radio transmit/receive portion and the antenna assembly does not deviate.

Detailed Description Text - DETX (68):

As in the wrist-mounted-type portable radio apparatus 1 of the first embodiment, the wrist-mounted-type portable radio apparatus 45 has the antenna assembly 13, which is a slot antenna having the slot 13c, comprised of the antenna elements 11a to 11d fixed in the pair of wrist bands 2a and 2b arranged on both sides of the main body 1a, and the electrically conductive plates 4a and 4b installed in the main body 1a and connected with

the antenna elements
11a to 11d. In the main body 1a, the circuit board 5
having the high frequency
ground pattern thereon and the reflective plate 6 are
disposed on the rear
surface side of the electrically conductive plates 4a and
4b in order to exert
their reflective ability to focus the directivity of the
antenna assembly to
its front surface side. When the wrist-mounted-type
portable radio apparatus
45 is mounted on a user's wrist, the rear case 9 thereof
is contacted with the
user's wrist. However, the antenna assembly 13 of the
wrist-mounted-type
portable radio apparatus 45 is shielded by the rear case
9 and the reflective
plate 6 against the wrist, and can prevent the adverse
affects from the human
body.

Claims Text - CLTX (4):

**2. A wrist-mounted-type antenna device according to
claim 1, further
comprising a reflective member in said main body for
improving an antenna gain
of said antenna device, said reflective member located
between said antenna
assembly and said rear surface of said main body.**

Current US Cross Reference Classification - CCXR (1):
343/702